

# PATENT SPECIFICATION

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## (54) IMPROVEMENTS IN OR RELATING TO DEVICES FOR BREWING INFUSIONS

(71) We, VENDING CENTRE (HOLDINGS) LIMITED, a British Company, of Grey-caine Road, Bushey Mill Lane, Watford, Hertfordshire, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to devices for brewing fresh coffee or other infusions.

Fresh-brew coffee machines exist in which a charge of coffee is introduced into a container and a measured quantity of hot water poured into the container and allowed to infuse, after which the infusion passes through a filter into a cup.

Proposals have been made for speeding up the infusion process by applying mechanical or hydrostatic pressure to the water resting on the coffee grains, or by applying centrifugal force. However a requirement exists for a reliable and simple machine which can be produced economically, and moreover for a machine in which fresh brewed coffee can be dispensed automatically.

According to the present invention, there is provided a device for brewing an infusion, comprising a container having an outlet at a lower end thereof, a filter arranged at the lower end portion of the container to close the outlet and to support an infusible substance on its upper surface, and a conduit extending into the container, the conduit having an outlet located in the lower end portion of the container above the filter, the outlet of the conduit lying adjacent the filter and facing a portion of the filter whereby fluid fed through the conduit in use of the device will clear infusible substance from that portion of the filter.

Further according to the present invention, there is provided a device for

brewing an infusion, comprising a container having an outlet at a lower end thereof, a lid for closing an inlet of the container so as to hermetically seal the container inlet, a filter arranged at the lower end portion of the container to close the outlet and to support an infusible substance on its upper surface, and a conduit for feeding pressurised fluid into the container so as to pressurise the interior of the container, the conduit having an outlet located in the lower end portion of the container above the filter, the outlet from the conduit lying adjacent the filter and facing the filter whereby in use of the device the pressurised fluid discharged from the conduit will clear infusible substance from a portion of the filter.

Still further according to the present invention, there is provided a device for brewing an infusion, comprising a container having an outlet at a lower end thereof, a filter selectively locatable at the lower end portion of the container to close the outlet and to support an infusible substance on its upper surface, and a conduit extending into the container, the conduit having an outlet located in the lower end portion of the container above the filter when the filter closes the container outlet, the outlet of the conduit lying adjacent the filter when the filter closes the container outlet and facing a portion of the filter whereby fluid fed through the conduit in use of the device will clear infusible substance from that portion of the filter.

An embodiment of the invention will now be described, by way of example only, with reference to the accompanying diagrammatic drawings, in which:

Figure 1 is a perspective view of a brewing and dispensing machine incorporating a brewing device in accordance with the invention, the device being shown located in a loading station of the machine;

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Figures 2 and 3 are views similar to Figure 1, but respectively showing the device in a dispensing station and a discharge or cleansing station of the machine;

5 Figure 4 is a fragmentary perspective view to an enlarged scale showing a lid-controlling cam assembly when the device of Figure 1 is located in the loading station; and

10 Figure 5 is a view similar to Figure 4, but showing the cam assembly when the device is located in the dispensing station.

As shown in the drawings, a device for brewing fresh coffee from coffee grains comprises an upright cylindrical container 2 having a removable base 4, which contains a filter 6, and a lid 8 which can be removed from the mouth of the container 2 to enable a charge of coffee grains to be introduced into the container 2. The lid 8 is capable of forming an airtight seal with the mouth of the container and a conduit in the form of a pipe 10 extends through the cylindrical wall of the container from a compressed air source. The portion of the pipe 10 within the container 2 is generally L-shaped extending radially and downwardly towards the centre of the filter 6 with its outlet closely adjacent to, and facing, the filter to cause compressed air to impinge on the central area of the filter 6 and keep it clear of coffee grains.

In use of the coffee brewing device described above, a charge of coffee grains is introduced into the container 2 through the open mouth, a measured quantity of hot water is poured into the container 2, the lid 8 is closed to effect an airtight seal and the coffee is allowed to infuse for a predetermined period of time. Compressed air is then introduced into the container 2 from the compressed air source via the pipe 10 and as it impinges on the filter 6 it keeps the centre area of the filter 6 clear of coffee grains and allows the infusion to be forced, under the pressure of the air, through the filter 6. The spent coffee grains can then be withdrawn by removal and cleansing of the filter.

In order to incorporate this device into a beverage dispensing machine, the container is mounted on a carriage 12 which slides on a pair of parallel spaced guide rods 14 from a loading station (Figure 1) to a dispensing station (Figure 2) and thence in the same direction to a discharge or cleansing station (Figure 3). The guide rods 14 are mounted on a frame of the machine.

60 The lid 8 of the container 2 is provided with a resilient peripheral seal 16 on its underside. The lid 8 is mounted on a vertical axle 18 which is journaled in bearings on the outside of the wall of the container 2, the lower end of the axle 18 sup-

porting a cam assembly by means of which the axle 18 (and thus the lid 8) can be raised, lowered, and rotated. As shown in Figure 4, the cam assembly comprises upper and lower co-operating cams 20, 22 rotatably mounted on the axle 18, the upper cam 20b being secured to the underside of the carriage 12. An eccentric square cam 24 rigid with the axle 18 is mounted beneath the lower cam 22 and is arranged to engage an abutment 25 formed on the inner surface of the machine frame. The lower cam 22, which is thus rotatable relative to the cams 20, and 24 carries a slotted radial arm 26 which engages a pin 28 on the machine frame. The removable base 4 carrying the filter 6 is hinged to the body of the container 2. Pivotal movement of the base/filter assembly between its closed position (which is maintained in the loading and dispensing stations) and its open position (reached in the discharge station) is controlled by a cam rail (not shown) at the same level as the base/filter assembly.

In operation, when the container 2 and its supporting carriage move out of the loading station towards the dispensing station the cam 22 is pivoted by the interaction between the arm 26 and the pin 28 and causes the cam 24 and the axle 18 to be thrust downwardly. Additionally, when the cam 24 strikes the abutment 25, the cam 24 is rotated through 90° into the configuration shown in Figure 5; in this manner, the axle 18 is rotated to locate the lid 8 in a position in which it overlies the mouth of the container 2. Continuing travel of the carriage 12 into the dispensing station causes further rotation of the cam 22 so that the axle 18 is lowered to move the lid 8 into sealing engagement with the mouth of the container 2. The rotation and downwards movement of the axle 18 during movement of the carriage 12 from the loading station to the dispensing station is effected against the bias of a helical spring (not shown) mounted on the axle 18.

The beverage dispensing machine can be made automatic by providing a drive chain which is driven at timed intervals by a timer, the chain having a pin extending from one link thereof which is engageable with a first abutment on the container 2 or its supporting carriage 12 at the level of the upper run of the chain for driving the container 2 from the loading station to the dispensing station and thence to the discharge station. The pin is thereafter engageable with a lower abutment on the container 2 or its supporting carriage 12 at the level of the lower run of the drive chain for returning the container 2 and carriage 12 from the discharge station to the loading station.

In operation of the automatic machine, the timer is released by a coin-feed device and operates a coffee grain feeder so that a measured charge of fresh ground coffee is introduced into the container and thereafter a measured quantity of water is discharged on to the grains at the loading station. After a timed period for infusion, the drive chain commences to move and drive the container 2 and carriage 12 toward the dispensing station, during which movement the lid 8 is rotated into a position above the mouth of the container 2 and drawn down to seal the container 2. In the dispensing station compressed air is directed into the container through the air pipe 10 to create sufficient pressure within the container to drive the infusion through the filter, an area of the filter 6 having been cleared of grains by impingement of the air from the tube 10 onto the filter 6. The infusion then flows through the filter 6 into a cup previously located in the dispensing station from an automatic cup dispenser. After a timed period the container 2 moves into the discharge station in which the base/filter assembly is released to pivot downwardly and releases the spent grains into a discharge duct, a hot water nozzle being directed against the filter 6 in its open position to wash the filter from its outlet side. The base/filter assembly is closed up to the outlet opening of the container 2 during the reverse movement of the container 2 and carriage 12 into the loading station, the movement into the loading station causing the cam assembly, under the bias of the helical spring to lift the lid 8 and rotate it away from the inlet of the container in readiness to receive a new charge of coffee grains and water. Although reference has been directed throughout to brewing coffee, the machine and particularly the brewing device can also be used for brewing tea or other infusions.

#### WHAT WE CLAIM IS:—

1. A device for brewing an infusion, comprising a container having an outlet at a lower end thereof, a filter arranged at the lower end portion of the container to close the outlet and to support an infusible substance on its upper surface, and a conduit extending into the container, the conduit having an outlet located in the lower end portion of the container above the filter, the outlet of the conduit lying adjacent the filter and facing a portion of the filter whereby fluid fed through the conduit in use of the device will clear infusible substance from that portion of the filter.
2. A device for brewing an infusion, comprising a container having an outlet at a lower end thereof, a lid for closing an inlet of the container so as to hermetically

seal the container inlet, a filter arranged at the lower end portion of the container to close the outlet and to support an infusible substance on its upper surface, and a conduit for feeding pressurised fluid into the container so as to pressurise the interior of the container, the conduit having an outlet located in the lower end portion of the container above the filter, the outlet from the conduit lying adjacent the filter and facing the filter whereby in use of the device the pressurised fluid discharged from the conduit will clear infusible substance from a portion of the filter.

3. A device according to claim 2, 80 wherein the outlet of the conduit is positioned above a central portion of the filter.

4. A device according to claim 2 or claim 3, wherein the filter is removable 85 from a position in which it closes the container outlet.

5. A device according to claim 4 in which the filter is hingedly connected to the container and is movable into an open 90 position in which it depends from the container.

6. A device according to claim 5 in which the lid is pivotally connected to the container. 95

7. A machine for brewing and dispensing an infusion, comprising a device according to any one of the preceding claims, and means operative to move the device between a loading station having 100 means for charging the infusible substance and liquid into the container, an infusion dispensing station having means for directing fluid into the container via the conduit, and a cleansing station having means for 105 removing spent substance from the filter.

8. A machine for brewing and dispensing an infusion, comprising a device according to claim 5, a loading station having means for charging the infusible 110 substance and then liquid in measured quantities into the container via the inlet, means operative to close the lid after the container has been charged with the infusible substance and the liquid, an infusion dispensing station having means for 115 feeding fluid under pressure into the container via the conduit, means for causing movement of the filter into its open position, a cleansing station having means for 120 directing liquid into the filter so as to remove the spent substance from the filter, and means operative to move the device sequentially between the loading station, the dispensing station, and the cleansing 125 station.

9. A machine according to claim 8, wherein the means operative to close the lid comprises a cam assembly arranged to cause movement of the lid during 130

movement of the device between the loading and dispensing stations.

10. A machine according to claim 8 or claim 9, wherein the means operative to move the device comprises a carriage reciprocable between the loading station and the cleansing station, the device being mounted on the carriage.

11. A device for brewing an infusion, comprising a container having an outlet at a lower end thereof, a filter selectively locatable at the lower end portion of the container to close the outlet and to support an infusible substance on its upper surface, and a conduit extending into the container, the conduit having an outlet located in the lower end portion of the container above the filter when the filter closes the con-

tainer outlet, the outlet of the conduit lying adjacent the filter when the filter closes the container outlet and facing a portion of the filter whereby fluid fed through the conduit in use of the device will clear infusible substance from that portion of the filter.

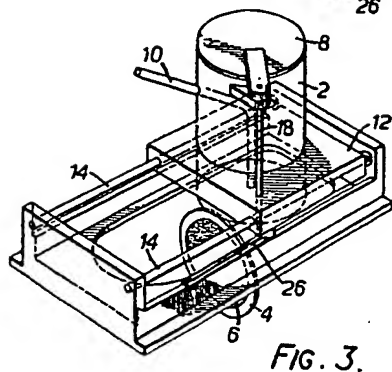
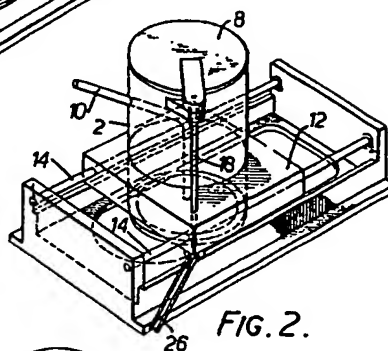
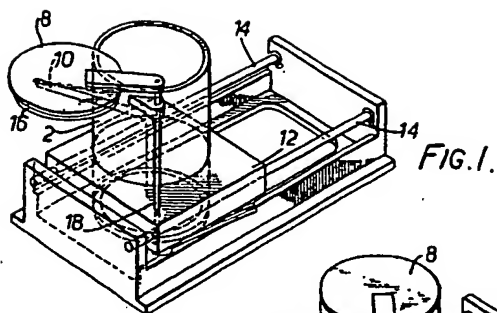
12. A device for brewing an infusion substantially as hereinbefore described with reference to the accompanying drawings.

13. A machine for brewing and dispensing an infusion substantially as hereinbefore described with reference to the accompanying drawings.

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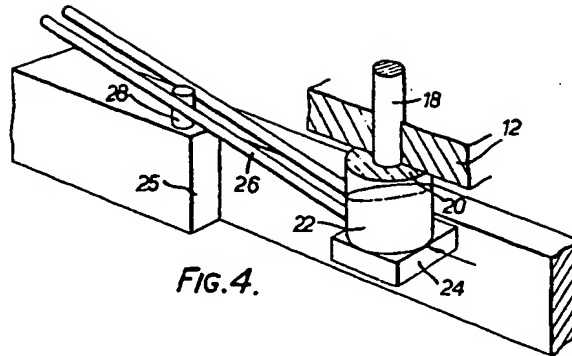


FIG. 4.

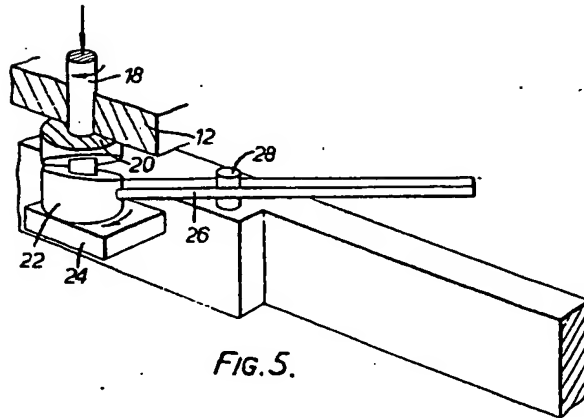


FIG. 5.